BRIEFING FOR PCB PLANT

SURVEILLANCE TEAMS

OFFICE OF SOLID WASTE MANAGEMENT PROGRAMS
HAZARDOUS WASTE MANAGEMENT DIVISION
JANUARY 7, 1976

DISCUSSION TOPICS

1. IN-PLANT SURVEY OF WASTE

2. TRACK OFF-SITE DISPOSAL

3. TECHNICAL ASSISTANCE TOOLS/REFERENCES

1. In-Plant Waste Survey

A. Quantification of Waste Streams *
   - Process Wastes
   - Emergency/one-time losses
   - Handling/Housekeeping Losses
   - Other

B. Source Reduction Opportunities
   - Recovery/recycle
   - Change in Procedure/Process
   - Source Separation

C. Temporary Waste Storage Practices

D. Awareness of Waste Disposition

* - Supplemental Summary Sheet Available

In-Plant

Summary of Waste Types

Quantity

1. Mildly contaminated PCB liquids (possibly recoverable)
2. Liquid PCB from solvent cleaning operations or water and detergent type washers
3. Saturated absorptive materials (i.e. sawdust) from spills, drips, etc.
4. Saturated solid wastes (i.e. paper, rags, gloves)
5. PCB - contaminated process oils lubricants
6. Scrap product contaminated with PCB (i.e. rejects)
7. Other

IN-PLANT SURVEY
SOLID WASTE ITEMS — KEYED TO SUMMARY OF WASTE TYPES

Check List -- Capacitors

	Yes	No
Date of Inspection		
Company Identification		
Plant (name, address, telephone)		
Parent company or headquarters (name, address, telephone)		
Responsible Officials		
Plant (name, title)		
Parent company or headquarters (name, title)		
Inspection Team		
Federal (name, title, division, organization)		
State (name, title, division, organization)		
Municipal (name, title, division, organization)		
Other (name, title, division, organization)		
Disposition of Wastes		
Receiving waters (for direct discharge)		
Municipal treatment system (including receiving waters)		
Landfill (name, address)		
Incineration (name, address)		
Other (such as disposal)		
Filling or impregnating fluids used		
Receipt, Transfer, and Storage		
How received (tank cars, trucks, drums)		
Where received (how far from use area)		
How unloaded into storage tanks		
Are tank cars cleaned after unloading?		
How?		
2 What happens to flushings or contaminated cleaning solutions?		
Drip pans under hose or pipe connections to tank car or trucks?		
Transfer hose or pipes drained where?		
Unloading area paved and diked? Collection sump?		
How are sumps emptied and to where?		
Unloading area roofed?		
How are samples taken?		
Where is excess sample disposed of?		
What disposition is made of samples after testing?		
Storage tank area paved and diked? Collection sump?		

	Yes	No
Receipt, Transfer, and Storage -- cont.		
Are raw filling fluids stored open to the atmosphere or under inert gas or under specially dried atmosphere or vacuum?		
If vacuum, how is vacuum obtained?		
Where does vacuum system exhaust to?		
Is exhaust equipped with vapor condenser?		
1 If so, where does condensate go?		
Where is vacuum pump cooling water obtained?		
2 Where does vacuum pump cooling water go?		
Is vacuum pump equipped with drip pans?		
5 How is contaminated vacuum pump oil disposed of?		
If stored under special atmosphere:		
What is it (nitrogen, dry air, etc.)?		
What pressure maintained on tank?		
Where does tank vent to?		
Is vent equipped with vapor condensor?		
1 If so, where does condensate go?		
Are transfer pumps in the storage area provided with drip pans?		
3 In all cases where drip pans are used, what disposition is made of accumulated drips?		
General Observations		
Workers handling of fluids		
3,4 Housekeeping		
Other		
Filling or Impregnating Fluid Purification		
Are pumps and filters equipped with drip plans or diked, with sumps?		
If filter aid blending tank surrounded by paved, diked area?		
How is spent filter aid taken off the filter?		
How is spent filter aid packaged for disposal?		
Is spent filter aid handled by employees? How?		
5 What is disposition of spent filter aid?		
If regenerated on site, where does regeneration provess exhaust to?		
Is exhaust equipped with vapor condensor?		
1 If so, where does condensate go?		

		Yes	No
	Purification -- cont.		
	Is purified fluid sampled?		
	How are samples taken?		
1	What is done with excess sample?		
	If fluid does not meet requirements, what happens?		
1	What disposition is made of samples after testing?		
	How are miscellaneous floor spills of fluid cleaned up?		
3	What happens to the sweepings?		
4	What happens to rage, wiping cloths, etc.?		
4	What happens to workers' clothing, gloves, etc.?		
	General Observations		
	Workers handling of PCBs		
3,4	Housekeeping		
	Other		
	Capacitor Impregnation-Submersion or Flood Filling Process		
	Is impregnation tank cleaned before each filling?		
2	What is done with any filling fluid removed from the tank in cleaning it?		
4	What is done with any rags used in the cleaning?		
4	What is done with workers' clothing worn in cleaning?		
	Are PCB vapors given off in preheating the tank prior to loading with capacitors?		
	Where is tank vented to during preheating?		
	How is vacuum obtained?		
	Where does vacuum system exhaust to?		
	Is exhaust equipped with vapor condensor?		
1	If so, what happens to condensate?		
	Is vacuum pump equipped with drip pans?		
	What oil is used in vacuum pump and how much?		
5	What happens to contaminated oil:		
	After capacitors have been flooded, where is impregnation tank drained to?		
	Are drainings sampled? How?		
1	What happens to excess sample?		
1	What happens to sample after testing?		
	What happens if drained fluid is defective:		
	to the fluid?		
	to the capacitors?		
	What happens if drained fluid is good?		
	Are pumps equipped with drip pans?		

		Yes	No
	Are tanks surrounded by paved, diked areas? With sumps?		
1,3	What disposition is made of contents of sumps and drip pan?		
	After impregnation tank is drained, are capacitors allowed to drip in tank, or taken out?		
	If the capacitors are taken out for dripping, are drip pans provided?		
3	What is done with the contents of the drip pans?		
	Is the area where newly filled capacitors allowed to drip adequately ventilated? How?		
	Where does ventilation system exhaust to?		
1	Is the exhaust equipped with vapor condensor and, if so, what happens to the condensate?		
	How are capacitors transferred to the sealing area?		
	Are drip pans provided?		
1,3	What disposition of contents?		
3	How are spills or overflows of PCBs collected in the sealing area?		
	After sealing, how are capacitors cleaned of residual fluid on the outside?		
	If by solvent or vapor degreasing, how is solvent reclaimed?		
	How is filling fluid residue from the solvent recycle system collected?		
2	How is it disposed of?		
2	If by washing with water or detergent solution, how are contaminated washings disposed of?		
	Are capacitors rinsed after washing?		
	If so, is rinse water reused?		
2	How is contaminated rinse water disposed of?		
4	What happens to solid waste contaminated with filling fluid? Especially, what happens to wiping rags and workers' clothing?		
	If solvent cleaned, how is filling fluid residue from the solvent system collected?		
2	How is it disposed of?		

General Observations

4	Use of protective clothing, gloves, etc.		
	Workers' handling of fluids		
3,4	Housekeeping		
	Other		

Note in particular whether walls and ceilings are coated with filling fluid in the vicinity of the impregnation tank and drip area.

	Yes	No

Observe workers who come in contact with filling fluid for chloracne or pigment discoloration.

5 If oil-water separator is used to separate filling fluid from water, what is done with oil layer? With the water layer?

Large Capacitor Impregnation/Transformer filling -- Direct Filling process

Is area around filling operation paved and diked?
How are spills cleaned up?
3,4 What disposition is made of contaminated solid waste?

How is vacuum pulled on the capacitor or transformer?
If by vacuum pump; where does pump exhaust to?
Is exhaust equipped with vapor condenser?
1 Where does condensate go?
Where does pump cooking water go?
5 How is contaminated vacuum pump oil disposed of?

If by steam jet, how is steam condensed?
1 What disposition is made of condensate?

How is filling line drained?

Laboratory

No. of employees
Quality control
Types of test performed and amount of sample used
(a) dieletric constant and loss tangent
(b) electrical breakdown
(c) distillation range
(d) density (specific gravity)
(e) others

R&D

Types of equipment used, test performed and amount of samples used?

Samples to be taken:

Soil scrapings in tank car unloading area
Vacuum pump cooling water
Oil-water separators (water layer)
Spent detergent solutions
Contaminated rinse water, etc.
Plant effluent a) direct discharge
b) to municipality
Steam jet condensate

General

6 How are defective capacitors or transformers disposed of?
Is filling fluid recovered?
Is rejected unit storage area paved and diked?

2. TRACK OFF-SITE TREATMENT/DISPOSAL**

TRANSPORTER

AWARENESS OF PROBLEM

HANDLING PROCEDURES-GENERATOR AND DESTINATION

TREATER/DISPOSER

AWARENESS OF PROBLEM

STATE/LOCAL LICENSES

SPECIAL HANDLING PROCEDURES

CONTROLLED INCINERATION

ISOLATED LAND BURIAL

** CHECKLIST AVAILABLE

Off-Site Disposal Checklist

Purpose: To track wastes from plant and/or temporary storage to ultimate destruction or deposition; compare actual disposition of wastes with generator's expectations

Transport Phase

Who is responsible for transport of wastes from plant and/or temporary storage? (including name of company, address, and responsible officials)

Is transporter licensed for (a) interstate (b) intrastate transport?

Is the transport agent also responsible for disposal?

Is not, what are normal arrangement for disposal of wastes by the transporter?

What, if any, State restrictions must be met?

What assurances, if any, does the generator have that the wastes reach the expected disposal facility? (In California, hazardous waste manifest should be available for examination). What precautions if any are taken in the selection of the transporter? Bonding? License? Knowledgeability?

Are the contaminated wastes isolated for the transporter? Does the transporter maintain this integrity (by isolation, separate pick-up, etc.)?

How does the transporter know, if at all, that wastes are contaminated with PCB? (e.g. by purchase requistion, label, color codes, or other identification showing quantity, concentrations of PCB's etc.)

Does the transporter take any placarding/labeling precautions regarding (especially) liquid wastes? What specific label/placard is placed on a shipment of PCB-contaminated wastes? On truck-load? On barrels/containers?

What resources (e.g. guides, references), if any, are available to the transporter or on the vehicle to aid emergency personnel in case of accident?

Treatment/Disposal Phase

What is the treatment (incineration) or disposal site for the wastes? (including name of company, address, and responsible officials). (Note: In advance of visit to site, it is advisable to consult available literature on such facilities - see list of references).

Is the facility permitted by State air, water or land agencies? If so, what are permit conditions?

How is the transporter's vehicle directed? What are controls to avoid mishandling/misdirecting the wastes?

Receipt, transfer, storage area information (especially at incineration facilities) - refer to related check list question from capacitor plant list.

For incineration facilities, what kind of incinerator is employed? Is waste treated prior to incineration? What are combustion temperatures, dwell times, excess air ratios when PCBs are burned? How are these levels assured?

In what form and how are wastes fed into the incinerator? What are feed rates, destruction efficiency? What is potential for escape of unburned PCB's to environment?

What are the pollution control devices on the incinerator? What is their efficiency? What happens to the pollution control residuals (e.g. scrubber water)?

What monitoring and/or instrumentation is available on the incinerator?

Is there provision for emergency shut-down of waste feed, etc. in the event of malfunctions, especially of the pollution control devices?

What is the disposition of the ash?

(Note: In the event that PCB-contaminated wastes are being incinerated during a visit, grab samples of scrubber water and ash as well as data on kind and amount of waste being burned would be useful. Samples of waste type to determine

its chemical and physical characteristics would also be interesting. It would also be useful to ascertain if stack sampling would be permitted by the owner at some future time).

For land disposal sites, how are wastes emplaced in the land? In what form are they? Are they segregated from other wastes? Are they "treated" in any way before burial? What kind of liner-either natural or articial - is used underneath the PCB disposal area? What is depth to groundwater? What types of soil characterize the area?

What provisions are made to avoid air and water emissions during handling?

What provisions exist to prevent surface water contamination during accidents, spills, flooding, etc.?

What records are kept of the types and amounts of PCB waste received? What records are kept regarding location of these wastes on the site plot?

Is groundwater monitoring conducted? How many wells are used? What parameters are tested and how often? By whom? Would water samples be available to EPA for analysis?

Is any air monitoring conducted?

What provisions are there for site security, warning notices, limitation of public access, etc.?

Are fire protection, worker safety gear, outside communication links, worker first aid and hygiene facilities available?

Is the local fire authority aware that PCB contaminated wastes are present? Are they prepared to deal with them?

To what extent do workers appear aware of special hazards of the PCB waste stream vs. others?

3. Technical Assistance Tools/References

Plant Site Discussions

Treatment/Disposal Site Discussions

Other Background Information

The following interim guidance is based upon HWMD staff experience and the TRW Report on Recommended Methods of Reduction, Neutraliztion, Recovery or Disposal of Hazardous Waste.

1. Recycling

Recycling of PCB's is usually feasible only with containers of pure liquids. Monsanto maintains a toll-free telephone number for the public to call to return relatively uncontaminated liquids. If liquids cannot be reused, Monsanto will incinerate returned liquids in their high temperature incinerator at the Sauget, Illinois plant.

Recycling of transformers is accomplished by GE and a few independent companies. The tank and inside copper is reclaimed; the PCB liquids can be drained and incinerated at GE's Pittsfield, Massachusetts plant.

2. Incineration

The technical literature indicates that liquid PCB's have been adequately destroyed by industrial high temperature incinerators (e.g., at 3000°F.) with high energy scrubbers. Rags, papers, and other software from electrical transformers manufacturing operations have been reported by industrial sources to be destroyed in rotary kiln incinerators. Several commercial companies (e.g., Rollins Environmental and Chem-Trol) have incinerated PCB's in the past; however, earlier this year Rollins in New Jersey was prohibited by the State of New Jersey from incinerating a shipment of PCB's from Japan.

A recent study for EPA has indicated that incineration of PCB's in sewage sludge by an approved municipal multiple hearth incinerator at high temperatures may be an adequate disposal method for similar sludges with a low PCB concentration. The study, currently still in draft form, concluded that there was no PCB found in either scrubber water effluent or in the ash and that less than .01 percent of the PCB's escaped destruction through the exhaust.

3. Landfill

HWMD does not recommend disposal of wastes containing PCB's in sanitary landfills. Region I Solid Waste representatives, after concurrence with HWMD, recently recommended that alternate disposal methods be developed for PCB wastes from a capacitor manufacturer who had been burying the waste in a local sanitary landfill. PCB's should only be placed in a secure chemical waste landfill as will be demonstrated in the EPA demonstration grant landfill in Minnesota. Several commercial firms who maintain State-approved secure landfills (e.g., Texas Ecologists in Texas and Chem-Trol in New York) have received PCB wastes for burial. A private company in Idaho which maintains an old missile silo as a hazardous waste disposal facility has been permitted to accept PCB wastes such as material collected at a spill near Seattle.

Under certain circumstances PCB's have been allowed in less than secure landfills, but they have usually been encapsulated in cement. A PCB spill in North Carolina was handled in this manner and then placed in an industrial landfill near the spill site.

4. Deep Well Injection

Some liquid PCB's have been reported by Region IV to have been shipped to Texas for deep well injection. However, in keeping with the Administrators' Decision Statement No. 5 on deep wall injection, the HWMD staff believes that there are better disposal alternatives such as incineration.

Disposal recommendations for PCB's are dependent upon the quantity and form of the waste. The primary recommendation is to return the waste to Monsanto or to properly incinerate the material. The current HWMD research on PCB's primarily deals with the incineration of capacitors containing PCB.

As well as can now be determined a good data base exists for the environmentally sound disposal of PCB wastes. The remaining key issue involves the determination of the adequacy of disposal of capacitors. As data for incineration of used capacitor units have not been developed, an HWMD project, Destruction of Hazardous Wastes in Commercial Scale Incinerators, will incinerate capacitors containing a PCB fluid in a commercial rotary kiln incinerator early in 1976 to determine the adequacy of this disposal method.